

Fort Ord Environmental Cleanup 2010 ANNUAL REPORT

Fort Ord BRAC Office

June 2011

CLEANUP PROGRESS ON ALL FRONTS

Fort Ord Cleanup Program

The Army, in consultation with the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the Regional Water Quality Control Board (RWQCB), carries out a major program to remedy environmental and safety problems left over from the many years of

training operations at the former Fort Ord. The Fort Ord cleanup is conducted under the Superfund or "CERCLA" cleanup process. CERCLA is an acronym for the federal law called the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund. It encompasses cleanup of soil and groundwater that contain hazardous substances such as metals, pesticides, and other chemical contaminants common to landfills, firing ranges, chemical spills, and other military sites.

The cleanup program has two goals: (1) protect human health and the environment, and (2) transfer land to the community for use. The Fort Ord Cleanup Program meets these goals by completing work in six major program areas:

2010 Cleanup Highlights

Munitions Cleanup

- Munitions cleanup completed on Units 14 and 19 (prescribed burns in 2009)
- Prescribed burns completed on Units 15 and 21 — munitions cleanup ongoing
- Munitions cleanup largely completed in Units 32 and 34.

Soil Cleanup

- Completed over 60% of contaminated soil removal from Site 39

Groundwater Cleanup

- All treatment systems are effectively removing or breaking down contamination
- The carbon tetrachloride groundwater plume is being treated using an innovative "bioremediation" technology
- An additional deep extraction well was added to the treatment system

Management of Environmentally Sensitive Lands

- Numerous environmental monitoring studies evaluating restoration of habitat and vernal pools were completed

Land Transfers

In March 2011, the Army completed the following land transfers:

- 1.5 acres of property described in the Finding of Suitability to Transfer (FOST), University of California Santa Cruz, Phase I, Fort Ord, California (UCSC Phase I FOST) to the University of California.
- 4.8 acres of property described in the Finding of Suitability to Transfer, Track 0 Parcels (FOST 6) to the University of California.
- 15 acres of property described in the Finding of Suitability to Transfer, Track 0 Plug-in C, Track 1 and Track 1 Plug-in Parcels (FOST 9) to Chartwell School.
- 116 acres of property described in the Finding of Suitability to Transfer, Track 0 Plug-in Group D, Track 1 Plug-in East Garrison Areas 2 and 4 NE, and Track 1 Plug-in Groups 1 – 5 Parcels (FOST 10) to York School and Chartwell School.

Community Outreach Program

- Over 50 significant community outreach events reached over 100,000 community members

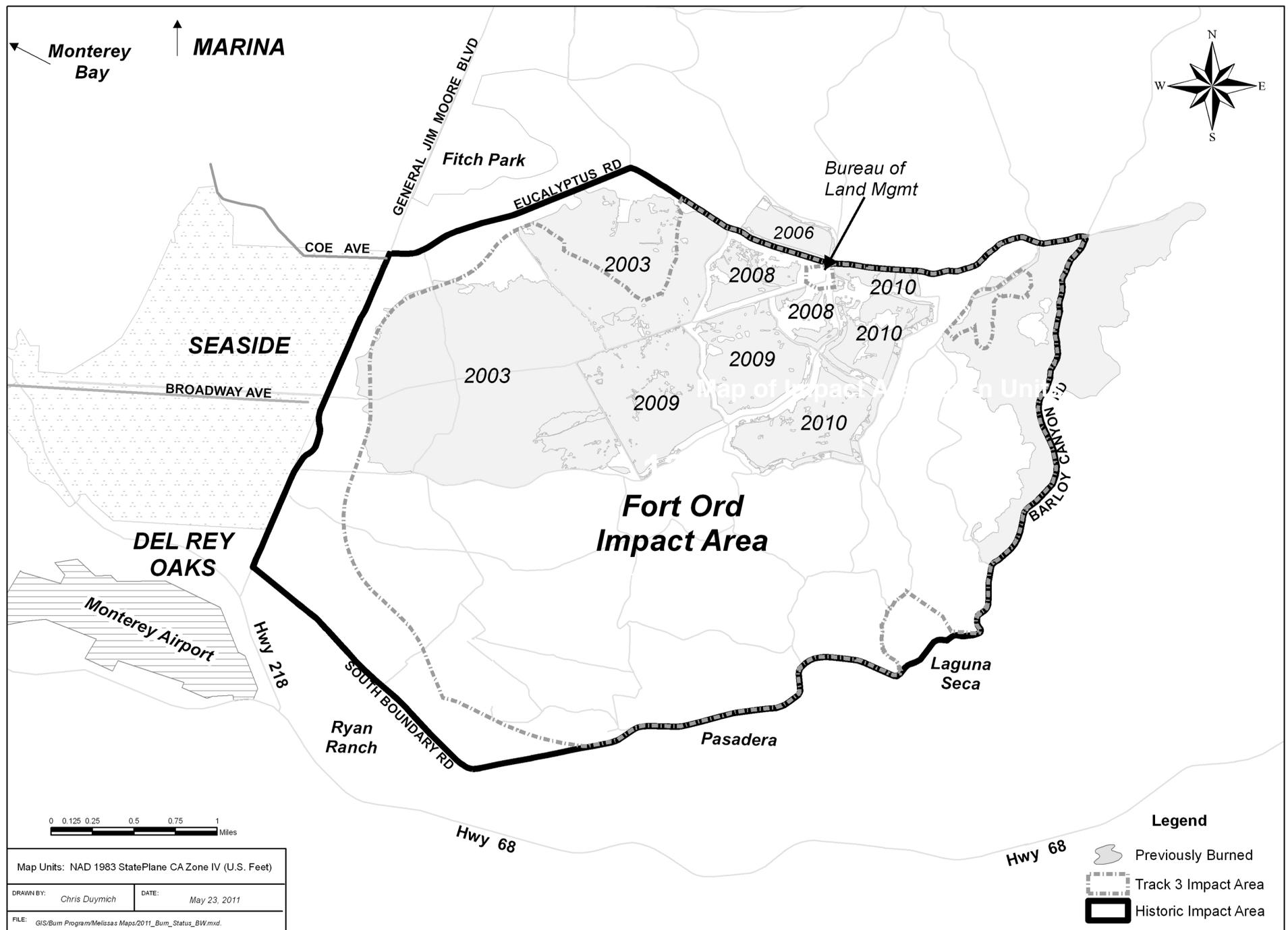
NOTE: This is a report of the recent progress of the U.S. Army Fort Ord Cleanup projects. Munitions cleanup is also being conducted by the Fort Ord Reuse Authority Environmental Services Cooperative Agreement Remediation Program also known as ESCA RP. For more information on ESCA RP munitions clearance, please call (831) 883-3675.

- Munitions cleanup: Cleaning up munitions and explosives left over from training activities, page 2
- Soil cleanup: Cleaning up contaminated soil, page 5
- Groundwater cleanup: Removing or breaking down contaminants that have leaked into underground water, page 5
- Management of environmentally sensitive lands: Protecting rare, threatened, or endangered species and their habitat during cleanup activities, page 8
- Land transfers: Preparing land for transfer to the community, page 8
- Community Outreach: Keeping the public informed about cleanup, activities and providing opportunities for involvement in key decisions, page 10

Record of Decision (ROD)

A ROD is a Superfund-required document that outlines the cleanup decisions for a site or group of sites. It contains information on site history, site description, site characteristics, community participation, enforcement activities, past and present uses, contaminated media, the contaminants present, description of the response actions to be taken, and the remedy selected for cleanup. The development of the ROD also includes consideration of how the site could be used in the future. The community is invited to comment on the proposed plan, a document issued prior to the ROD, which includes the site information and summarizes the remedies. When the comment period is complete, the ROD is signed (indicating approval of the proposed cleanup in the ROD) by the Army and regulatory agencies. Then cleanup process can begin. Each Fort Ord cleanup site (soil, water, and munitions) has an associated ROD. If you're interested in the details of a particular cleanup at Fort Ord, the ROD includes a summary of the investigation results, the cleanup options considered, as well as details on the cleanup method that was selected. All the Fort Ord RODs are available in the reference document section of www.FortOrdCleanup.com.

Para obtener una copia de la reporta en Espanol, contacte (800) 852-9699.



Areas where brush was cleared during 2010, as well as the area where prescribed burns were conducted in 2009.

Munitions Cleanup

During the period when Fort Ord was an Army training installation, one of its primary jobs was to teach soldiers how to fire guns, artillery, mortars and rockets. This meant there had to be an area where these could be fired, over and over. At Fort Ord this training was concentrated in an area known as the “Impact Area.” Throughout the Impact Area, there are heavy concentrations of munitions debris. There are also unexploded munitions and explosives that could still explode if someone stepped on them, bumped them, or otherwise mishandled them. These are known as “munitions and explosives of concern” or “MEC.” Most of the explosive munitions items that need to be cleaned up are located on the surface of the land or within a few inches of the surface.

The impact area is fenced, posted with warning signs, and patrolled. But anybody trespassing on the land could be killed or maimed if they accidentally triggered unexploded munitions or explosives known to be in the area. This is a particular problem because the impact area is located near several schools. In

past years there have been trespassing incidents involving children.

Fort Ord is now cleaning up the entire installation, but the Impact Area is one of the most challenging cleanup jobs. Not only are there heavy concentrations of debris and MEC, but the land is covered with vegetation known as Central Maritime Chaparral. Central Maritime Chaparral habitat is protected because it is comprised of several rare, threatened, or endangered species.

Workers who clean up munitions and explosives also face the risk of triggering unexploded munitions and explosives. So it is very important that they can see the ground where they are working. But much of the land is covered by vegetation that is very dense and can grow taller than the workers.

Several years ago the Army and regulatory agencies — after an extensive public comment period, review of alternatives, and careful consideration of health and safety risks — decided that prescribed burns were the best way of removing the vegetation in the Impact Area. A prescribed burn is a fire set by fire management experts to burn only in a contained

area under conditions that will meet goals including worker and community safety, minimizing smoke impacts, and achieving the desired vegetation removal for the cleanup of munitions.

One of the important considerations in deciding to use prescribed burns for vegetation removal is that Central Maritime Chaparral Habitat — including many of the species that live in that habitat — is sustained by periodic fires. Over the ages these species have adapted to occasional fires as part of a natural cycle. Chaparral habitat that is cut rather than burned grows back with less diversity. As a result, the Army has entered into agreements with environmental regulatory agencies to strictly minimize the amount of chaparral that is cut. Typically it is cut only to create containment lines or in areas where prescribed burns are not feasible. These areas must still be burned later.

Each year — weather conditions permitting — the Army conducts prescribed burns on hundreds of acres within the impact area. Then the Army proceeds to clean up munitions and explosives of concern. The weather conditions must meet a “prescription” to ensure proper



Pictured are (left) the machine that does the mastication and (right) the containment lines prior to the prescribed burns.

burning, ensure fire control, and minimize smoke impacts on the community. These weather conditions occur only a few days each year, and in some years no prescribed burns are possible.

One reason the Army limits the acreage of burns is to ensure it has the resources to clean up the cleared land within the several months immediately following the prescribed burn. If more land was burned than could be cleaned up in a short period of time, the brush could grow back. This could require a second prescribed burn in that area or additional cutting of the recovering vegetation (that will be detrimental to the habitat). If fires occur too frequently in Central Maritime Chaparral it damages the rare habitat, resulting in an increase in non-native and other more common species that reduces the natural diversity.

Ultimately the entire Impact Area will be cleaned up.

Prescribed Burns in 2010

The map at the top of page 2 shows the areas where brush was cleared during 2010, as well as the area where prescribed burns were conducted in previous years. A prescribed burn was conducted in Unit 21 on October 7, 2010. A second prescribed burn was conducted on October 8, 2010 to clear Unit 15.

Prescribed burns could not be conducted on all of Units 34 and 32 because of the presence of power lines. Vegetation on these units was cut to serve as part of the containment lines, and to ensure that the fire would not escape from the containment area. On Units 34 and 32 the brush was cleared by a large machine that cuts the brush, chews up the materials, and spits out wood chips. This process is referred to as “mastication.”

These containment lines vary in width from 220 to 235 feet depending on the types of munitions that could be present in the planned burn area. The pictures

above show the machine that does the mastication and the containment lines prior to the prescribed burns.

Even though the brush has been “masticated,” the Army will burn off the wood chips to encourage the re-growth of the brush. The masticated areas will be monitored following the munitions cleanup to ensure the habitat recovers.

After each prescribed burn the Army does a careful evaluation on the success of the burn to see if there are lessons learned that can be applied to future burns. The criteria by which a prescribed burn is evaluated include:

- Complete prescribed burn operations with no injuries to fire personnel or to the surrounding communities,
- Hold the burn within the established containment lines,
- Minimize smoke impacts,
- Clear vegetation to allow an unobstructed view of the ground for MEC remedial action workers, and to
- Minimize damage to rare, threatened, and endangered species.

During the 2010 prescribed burns there were no injuries to prescribed burn personnel or people in the surrounding community, and the burn was held within the containment lines. The prescribed burns consumed 79% of the vegetation on Unit 21 and 97% of the vegetation on Unit 15. Both of these figures are considered acceptable. However, only 50% of the masticated vegetation was burned. This is a considerable improvement over last year’s mastication burns. But, while acceptable, this could still be improved. Additional work will be done to try to determine how to improve this figure.

Smoke was observed in the Highway 68 corridor area after the active ignition was completed on both days of burning, but the smoke dissipated after a few hours. Some evidence of smoke was

reported in Carmel after the onshore sea breeze arrived. The air monitoring program identified no exceedances of air quality standards as gauged by the total amount of particulate matter of 10 microns (PM10) and smaller in size in samples taken at stations scattered around the local area.

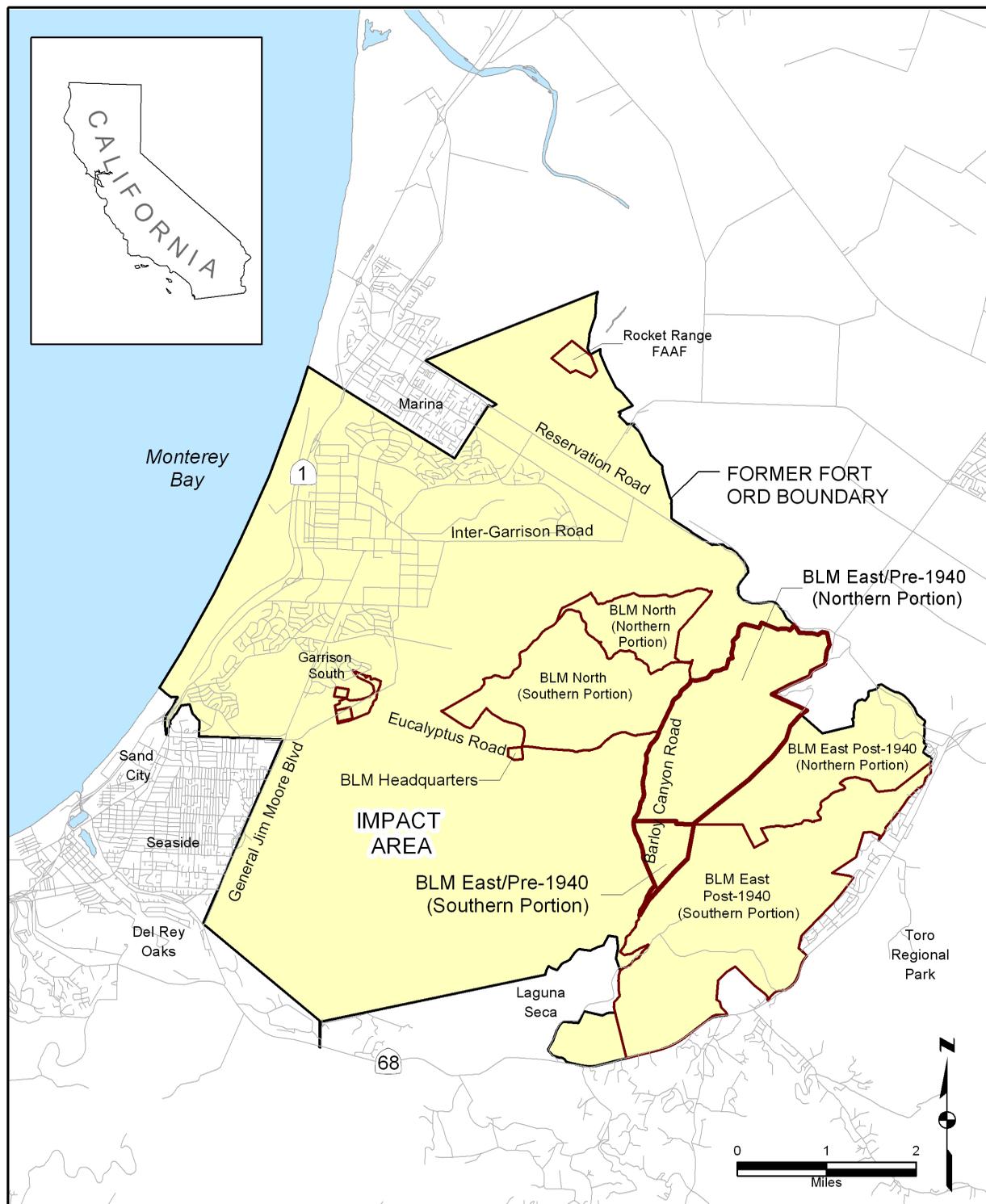
Most of the smoke lofted well above the local communities. Although the percent of the smoke generated during the smoldering phase — the period after a prescribed burn has occurred — is minimal, smoldering tends to generate the majority of the inquiry and/or complaint calls. Some particulates were detected in air quality samples at ground level during the 24-hour period following the fire.

Presently, at the recommendation of the Monterey Bay Unified Air Pollution Control District (“Air District”), residual vegetation ‘islands’ are burned quickly to limit smoldering time. Discussions continue as to how to further reduce the amount of smoldering after the burn operations.

Other changes to existing procedures have been established and are in place for the future burn program. These changes and recommendations will be instituted in the burn program as appropriate, taking into account the burn unit size, vegetation density, terrain, smoke management, escape potential and the close proximity to the community.

The key changes in 2010 included: (1) reducing smolder by burning the area cut around the burn units during main burn event, and (2) reducing smolder by starting and completing burn before the onset of the afternoon sea breeze.

The Army holds continuous fire-weather forecasting and weather pattern discussions with the project meteorologist from the Naval Postgraduate School, Air District, California Air Resources Board, and the National Weather Service to draw a consensus based on the fore-



Location of BLM areas with continued investigations.

casting models. This proved to be a valuable asset in the mobilization and Go/No Go decision to start the prescribed burn. Also onsite weather stations, providing real-time weather readings, were instrumental in the success of the burn. In 2010, the Air District used a new air sampling device, called a Beta-attenuation particulate monitor or E-BAM, to measure air quality.

Munitions Removal in 2010

Once the brush is cleared, workers can then go over the land to remove unexploded ordnance and explosives that are made visible as a result of the burns. Workers are aided by sophisticated electronic devices that detect metal that is not visible due to remaining ash or vegetation. This is called a surface removal.

After the surface is safe for workers, a subsurface removal may be necessary. A subsurface removal may use several techniques to find and remove MEC

still buried underground. Sophisticated measurement devices are used to detect underground metal. Computers are used to analyze the data (detections) produced by these devices and a map is made to guide workers to those locations. Unfortunately the measurement devices and computers can only tell workers where there is possibly a metal object in the ground — it cannot tell whether that object is just metal debris or unexploded ordnance or discarded munitions. So to complete a subsurface removal, each mapped detection — referred to as an “anomaly” — has to be dug up. As can be expected, most of the time the anomalies are just metal objects, such as a shell casings. But every now and then there are munitions or explosives that could be dangerous. Because these munitions or explosives are dangerous they are either exploded in place or consolidated in a single area and exploded all at once.

Finally, a map of the subsurface of the

area is made using sophisticated measurement devices to detect and locate underground metals or anomalies. This map may be used in the future to guide workers to avoid areas where anomalies remain underground.

In 2010, cleanup workers concentrated on removing munitions and explosives from Units 14 and 19. Prescribed burns were conducted on these units, shown in grey in the map on page 2, in October 2009.

The next step was to remove items that were made visible by the vegetation removal in those units, and in Unit 14A (a small area where the 2009 prescribed burn spotted-over the primary containment line). A total of 159 MEC items and 189,643 pounds of metal debris were removed from these areas. This action was completed in March 2010. What followed was a detailed mapping of the location of possible subsurface MEC. This process — known as digital geophysical mapping — was completed in May for Unit 14 and July 2010 for Unit 19.

The Army performed subsurface clean-up, removing items to a depth of several feet in two areas designated in coordination with the regulatory agencies and the Bureau of Land Management. This work, including quality control inspections, was completed.

All onsite work is now complete so we will be finishing the site by completing the reporting, annual surface inspection, and habitat recovery monitoring.

Investigation of Bureau of Land Management (BLM) Areas

Field investigation in the BLM property outside of the Impact Area began in 2010. These areas include public lands that were transferred to BLM in 1996. The Army is conducting this work to complete the regulatory process under Superfund. Several munitions response sites were identified and evaluated and MEC removal actions were completed in some sites, before the property was transferred to BLM in 1996. The property is safe for the current use of the area for recreational access (such as hiking, biking and horseback riding). The Army’s field investigation activities involved mainly site walks with detection instruments and Global Positioning System (GPS) tracking devices to document evidence of past military munitions training in the area. The investigation fieldwork will be completed in 2011.

Soil Cleanup

In 2009, the Army and regulatory agencies issued a Record of Decision Amendment for soil cleanup at Site 39. Site 39 Inland Ranges was the location for ranges used for live fire training resulting in areas contaminated with lead and explosives residue in the soil. Site 39 is located mostly within the 8,000-acre "Impact Area."

Previously the Army removed the contaminated soils from the portions of the site that are designated for future development and placed the soil in the Operable Unit 2 landfill beneath a cap. The cap prevents contact with soil and prevents rainwater from running through the site, ensuring that rainwater cannot carry contamination from the landfill into the groundwater beneath. This action was completed in 2003.

The Army had to revisit the cleanup to take into account the results of an Ecological Risk Assessment study that considered the impact of contamination on the environment. Following preparation of the Ecological Risk Assessment (2007) and a Feasibility Study Addendum (2008), the Army developed a proposed plan. This proposed plan was adopted and described in the Record of Decision Amendment published in August 2009.

The decision was made to excavate approximately 125,000 cubic yards of contaminated soil from the Habitat Reserve portion of Site 39. This soil is being placed on top of the existing cap located on top of the Operable Unit 2 landfill. When completed, the additional soil will add a new layer of soil that will average six feet in depth. A new cap will be placed on top of the soil and welded to the existing cap, sealing the contaminated soil between two caps.

Site 39 soil cleanup is in progress. Over 80,000 cubic yards of the 125,000 cubic yards have been excavated and placed on Cell E of the former Fort Ord Landfill. Excavation of the remaining 45,000 cubic yards of contaminated soil will be completed in 2011. The excavated areas will undergo habitat restoration over the next several years to replace the habitat disturbed by the soil excavations.

Groundwater Cleanup

The Army and regulatory agencies have identified four areas on the former Fort Ord where chemicals have contaminated groundwater. "Groundwater" is water below the surface of the ground. When you use water from a well you are using groundwater.

To understand how the groundwa-

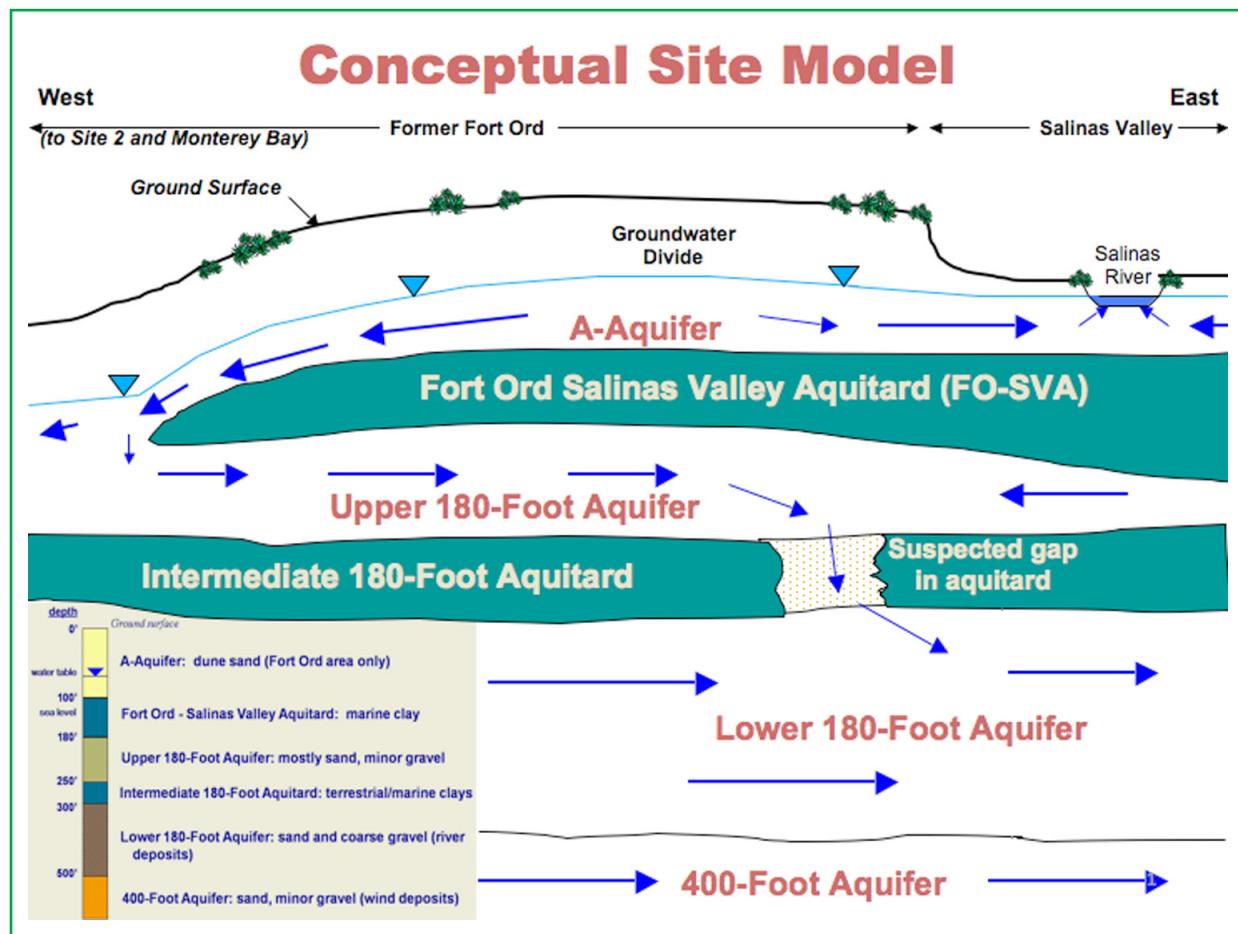


Figure 1. The groundwater and clay/soil layers under the Marina, California, area of Fort Ord.

ter cleanup works, it is first necessary to understand a little about the geology of the land. Figure 1 is a diagram of the earth underneath the surface of the former Fort Ord. When rain falls on the land, some of the water — especially where there is sandy soil like that found on the former Fort Ord — passes into the ground. Once the water moves underground, it is then called groundwater. The groundwater percolates through the soil until it reaches an underground layer of clay or rock and can go no further. When this happens, water accumulates in the ground forming what are called "aquifers."

As you look deeper underground, there are more and more layers of sand and gravel that hold trapped groundwater forming separate aquifers, which are separated by other layers of clay and rock, called aquitards. The groundwater within these aquifers moves in different directions, called "groundwater flow", which can make cleanup of contaminated groundwater very difficult. As chemicals that are released into the ground come in contact with groundwater, they get dragged along with the moving groundwater and spread out into what are called groundwater "plumes."

If the groundwater is flowing relatively fast through sandy aquifers, like those at the former Fort Ord, large groundwater plumes can form and can stretch for miles. This is the case with some of the plumes at former Fort Ord. Sometimes groundwater can even move up and down between shallow and deep aquifers because the separating clay and rock layer between them may be thin or

non-existent in some areas. Chemicals such as those found at former Fort Ord like trichloroethylene (TCE) and carbon tetrachloride are heavier than water and some portion of them sinks down into the deeper aquifers. Deeper aquifers tend to be harder to treat because you have to drill very deep, sometimes hundreds of feet, just to reach them for testing.

Under the former Fort Ord there are multiple aquifers, in layers: A-Aquifer, Upper 180-Footer Aquifer, Lower 180-Footer Aquifer, and the 400-Footer Aquifer, as shown in the Conceptual Site Model at the top of this page.

Where the Cleanup Is Occurring

The Army is responsible for cleaning up the groundwater at four sites to levels matching or below safe drinking water standards established by the EPA. A quick snapshot of the four sites and the cleanup approach being employed by the Army is shown in the table on page 6.

Following is a summary of progress to date on each of those sites.

Operable Unit 1

In 1988 the Army began pumping contaminated water from the ground and passing the water through granular activated carbon which removes volatile organic compounds. The treated groundwater is then pumped back into the groundwater.

In 1995, the Army and its regulatory partners, the EPA, DTSC, and RWQCB completed and signed the Operable Unit 1 Record of Decision (a Record of Decision (ROD) is an official decision docu-

ment that describes the selected cleanup for an area). See ROD description on page 1. The OU1 ROD established a specific aquifer cleanup goal (the cleanup goal for a contaminant in groundwater identified in a ROD) for each of ten compounds of concern (COCs), including TCE, the primary COC. Originally there were 10 volatile organic compounds of concern found in the groundwater below this site.

As of 2008, nine of the original compounds of concern are now below safe drinking water standards or no longer detectable. These nine compounds of concern meet the aquifer cleanup goals described earlier. Only TCE (Trichloroethylene) remains above the drinking water standards. The area affected by TCE has also shrunk dramatically over time.

Many monitoring wells and three pump-and-treat systems have been installed over the years. Two of the three treatment systems have been shut down or “mothballed” when the aquifer cleanup goal was achieved. A series of rebound tests for these two systems indicated that COC concentrations (TCE) remain below the aquifer cleanup goal. Even though these groundwater treatment systems were shut down, the Army continues to monitor the groundwater in this area to make sure the cleanup remains complete. Overall, in recent years, concentrations have been steadily

decreasing and the footprint of the contaminated plume has been shrinking, indicating that the remaining treatment system will achieve a successful cleanup. Continued monitoring of selected wells ensures that the cleanup remains effective after all treatment systems are eventually shut down. For further assurance that the groundwater cleanup remains successful, Monterey County has adopted an ordinance prohibiting new water supply wells in the OU1 area until cleanup is completed.

Operable Unit 2

During the years Fort Ord served as a training base, it operated a landfill. This landfill provided garbage disposal for Fort Ord’s housing, offices and support facilities, such as machine shops and motor pools. The Army stopped accepting waste into the landfill in 1987. Operable Unit 2 (OU 2), the Fort Ord Landfills site, consists of landfills covering approximately 150 acres, the immediate surrounding area, and the associated contaminated groundwater.

Like many municipal landfills from this era, Fort Ord’s landfill was later found to be leaking hazardous chemicals into the groundwater beneath it. This resulted from rainwater percolating down in the landfill waste, leaching out chemicals and carrying them downward into the groundwater below the landfill.

Once in the groundwater, the chemicals are transported by the flow of the groundwater.

The Army, in collaboration with three federal and state regulatory agencies, implemented a program to clean up the contaminated groundwater and prevent further contamination from leaching from the landfill. This program included placing an impermeable engineered cover system over the landfill. This cover prevents water (such as rain) from moving downward through the waste and into groundwater. This removed the risk of new contamination, but the problem of cleaning up the existing groundwater contamination remained.

Eleven COC were identified during the Army’s investigation of groundwater. Just like OU1 mentioned earlier, TCE is the primary compound of concern because it is detected at the highest concentrations across the greatest extent of the impacted groundwater and is the most toxic. The groundwater treatment technology, granular activated carbon, is effective at removing TCE and the other compounds of concern. TCE has migrated in shallow groundwater, called the A-Aquifer, from the landfill westward towards Monterey Bay and down into the Upper 180-Foot Aquifer and Lower 180-Foot Aquifer, two deeper groundwater aquifers. See figure 1 on page 5 for details of these layers.

The OU 2 treatment system has been operational since 1995. The system consists of pumping contaminated groundwater from extraction wells that pump from the shallow A-Aquifer, and extraction wells pumping in the Upper 180-Foot Aquifer. The OU2 treatment system includes sixteen extraction wells in the A-Aquifer and eight extraction wells in the Upper 180-foot Aquifer. The system removes the contaminants by passing the water through granulated activated carbon (much like the water filters sometimes installed on kitchen taps). The system has treated over 5.1 billion gallons of contaminated water and re-injected it back into the ground. Over 674 pounds of contaminants have been removed from groundwater. The Army has made great progress in stopping the source of contamination from the landfill and treating the contaminated groundwater, but the groundwater plume remains somewhat large. The Army is currently evaluating ways to speed up the cleanup process of the OU2 groundwater plume. In the mean time, the Army will continue to treat groundwater and monitor progress.

Table 1. The four cleanup sites and the cleanup approach being employed at each.

LOCATION	CLEANUP METHOD
Operable Unit 1: A former fire fighting training area at Marina Municipal Airport	Groundwater is extracted using wells and passed through granular activated carbon, which removes contaminants. Treated groundwater is re-injected into the ground.
Operable Unit 2: A former base landfill south of the corner of Imjin and Abrams Roads	Groundwater is extracted using wells and then treated with granular activated carbon which removes contaminants. Treated groundwater is re-injected into the ground.
Sites 2 and 12: A former truck and auto maintenance facility just east of Highway 1	Groundwater is extracted using wells and then treated with granular activated carbon which removes contaminants. Treated groundwater is re-injected into the ground.
Operable United Carbon Tetrachloride Plume	<p>A Aquifer: In situ biodegradation</p> <p>Upper 180 Aquifer: Groundwater is extracted using wells and then passed through granular activated carbon which removes contaminants. Treated groundwater is re-injected into the ground.</p> <p>Lower 180 Aquifer: The contamination is already degrading as the result of natural processes. The Army is carefully monitoring this natural degradation, with the option of extraction and treatment with granular activated carbon.</p>

Sites 2/12

Groundwater contamination at Sites 2/12 originated from a former auto repair shop on the east side of Highway 1. During operation of the repair shop, TCE was spilled or released onto the soil where it leached down into the groundwater. Contamination is extracted by pumping groundwater, passing it through granular activated carbon, and then injecting treated water back in the ground. This treatment process has been going on since 1999, and the plume underneath this site has shrunk to 1/3 the original footprint. The treatment system has cleaned over 1.4 billion gallons of water, removing over 433 pounds of contaminants. Cleanup is estimated to be completed in 4-7 years.

Operable Unit Carbon Tetrachloride

Carbon tetrachloride, sometimes called carbon tet, is a solvent that in years past was commonly used in fire extinguishers, pesticides, chemical manufacturing and as a cleaning agent for machined parts.

The Army believes that the origin of contamination was leaking or dumping of carbon tetrachloride at a radio repair shop on the former Fort Ord. Some of it must have been dumped out on the ground, resulting in a carbon tetrachloride plume in groundwater beneath the former Fort Ord.

Initially only the A-Aquifer, the uppermost aquifer, was thought to be contaminated. But subsequent inspections by the Army found contamination in monitoring wells in the Upper 180-Foot Aquifer, and low levels of contamination in the Lower 180 Foot Aquifer. See figure 1 on page 5 for details.

The cleanup plan for each of the levels is different. In the A-Aquifer, the Army is using an innovative process called in situ bioremediation. "In situ" simply means "in place." That is, the treatment doesn't require extracting the water to remove the contaminant. Bioremediation is a process where the bacteria that are naturally occurring in groundwater break down harmful chemicals into harmless byproducts like carbon dioxide and water. Treatment is accomplished by injecting lactate (a form of lactic acid found in milk) into the groundwater. The lactate works with bacteria already in the ground water to break down the carbon tetrachloride. One kind of bacteria in the ground water eats (metabolizes) the lactate, and in the process removes oxygen from the ground water. Once the oxygen

is removed, another kind of bacteria in the groundwater begins to populate the area. Since there is no longer oxygen in the groundwater, these bacteria use other compounds in the groundwater, including carbon tetrachloride, to metabolize. As part of this process, the carbon tetrachloride is broken down into harmless compounds. By using this innovative technology, the Army reduces the need for drilling and installing long-term pumping wells, and expensive treatment systems. This approach also reduces electric power consumption associated with pumping and treating.

In the next deeper aquifer, the Upper 180-Foot Aquifer, the carbon tetrachloride will be removed by extracting the groundwater using newly installed pumping wells and treating the water at the Operable Unit 2 treatment system with granular activated carbon which removes the contaminants. The treated water is then re-injected into the Upper 180-Foot Aquifer.

In the third deeper aquifer, the Lower 180-Foot Aquifer, the concentrations of carbon tetrachloride are very low and

contamination coming from higher aquifers has been stopped by pumping from the Upper 180-Foot Aquifer. The levels of the remaining carbon tetrachloride are continuing to decrease through naturally occurring processes like bioremediation. For this reason, the water is not being actively treated. Instead the Army has installed monitoring wells that allow it to check and make sure concentrations are continuing to get lower. If natural processes don't remove the carbon tetrachloride, the Army retains the option of extracting water and treating it, as it is doing in the Upper 180-Foot Aquifer.

In addition to this work to remove contaminants, additional protection is provided through "institutional controls." These institutional controls apply to all four groundwater areas and include deed restrictions, land use covenants, and municipal and county codes restricting installation of wells in these areas to prevent people from coming in contact with contaminated groundwater.

Drinking Water Is Safe

The Marina Coast Water District (MCWD) supplies water to the City of Marina and former Fort Ord. The water supplied at Fort Ord meets regulatory standards. Water quality is regularly tested by MCWD and results are reported in a Consumer Confidence Report available at www.mcwd.org/water_quality.html. The City of Marina's drinking water wells draw water from very deep aquifers over 900 feet below the ground surface. MCWD collects samples from these wells annually which are analyzed by a state-certified laboratory. Results show all the wells provide safe drinking water which meets all federal and state standards.

Drinking water quality is a very important part of the cleanup process. Records of Decision (these are documents which set the groundwater cleanup standards and cleanup methods for each of the Army's groundwater cleanup sites) have been established for all 4 groundwater cleanup sites. In all cleanup decisions, the Army is required to cleanup the groundwater until it meets the drinking water standard. The Army is cleaning and/or monitoring all of these groundwater cleanup sites in accordance with each site-specific Record of Decision.

The Army has been monitoring the groundwater since 1988. Very low concentrations of TCE have been identified in the drinking water supply wells, but these results are well below drinking water standards. These sample results continue to confirm that the water is safe to drink. The Army and MCWD sample and monitor the drinking water supply wells 8 times each year to ensure any changes in the water quality are quickly identified. In addition, the Army has treatment systems in place to clean up the contamination. Every three months the water sampling results are evaluated. These results are used to create models of the size, level of contamination and direction of the contaminated water. All modeling results indicate the treatment systems are working properly and confirm that drinking water is safe.

Management of Environmentally Sensitive Lands

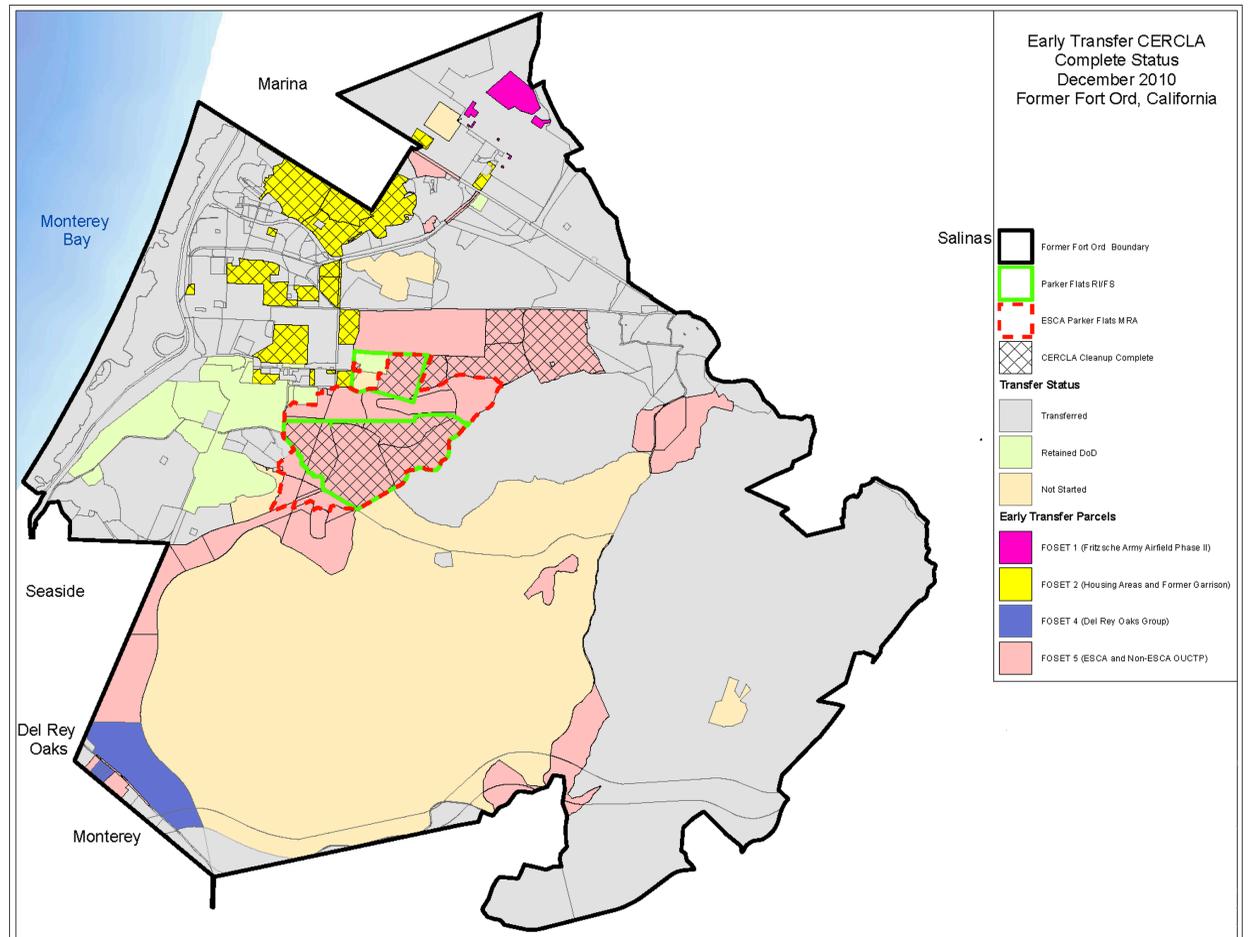
The former Fort Ord is home to a number of rare, threatened, or endangered plants and animals. One of the Army's jobs is protecting these species even while the cleanup goes on. In particular, during munitions and explosives cleanup, the Army remains responsible for reestablishing healthy maritime chaparral, vernal pools and ponds after the cleanup work is completed.

In past years the Army conducted studies that provided a baseline of existing conditions prior to cleanup. After cleanup the Army monitors biological resources to assess the successful recovery of species and habitat. Follow-up monitoring is conducted to document the recovery of the habitat from the effects of the cleanup activities.

During 2010 Units 15, 21, 32, and 34 were surveyed in preparation for the 2010 prescribed burns. Units 14 and 19 were also surveyed, as a first year follow-up after prescribed burns on these units last year. A fourth-year survey was also conducted on Ranges 43-48.

During 2011 the following areas will be monitored: Units 11 and 12 will be surveyed in anticipation of vegetation clearance to be conducted in the fall of 2011. Units 15, 21, 32, and 34 will be surveyed for a first-year follow-up. MRS-16 (an area that was burned in 2006 followed by munitions clearance) will be surveyed (third survey). There will also be monitoring on the north side of South Boundary Road (second survey).

Results of surveys are documented in annual habitat monitoring reports which are posted in the Administrative Record (www.fortordcleanup.com).



Details on the status of early land transfers completed as of December 2010

Land Transfers

Once land has been cleaned up to levels protective of human health and the environment, the next step is to transfer the land to the community for other uses. The documentation required to make this transfer is extensive, and can take several years. A key document is called a Finding of Suitability to Transfer (FOST), which requires signatures at a high level from the Army. As property becomes available for transfer (i.e. when environmental cleanup is completed) a FOST is provided to the regulatory agencies (i.e. USEPA, DTSC and RWQCB) and the public for review and comment.

The Army does not decide who receives the land, or how the land is used

once it is transferred. These decisions are made by the Fort Ord Reuse Authority (FORA). FORA was established by the California State Legislature and has a board of directors consisting of representatives of local governments, elected officials, and major users of the land. The reuse of land at the former Fort Ord is documented in the 1997 Fort Ord Reuse Plan. The area of the former Fort Ord is about 27,827 acres. To date, about 19,280 acres have been transferred and about 811 acres are retained by the Army for continued use by the federal government.

Recent Land Transfers

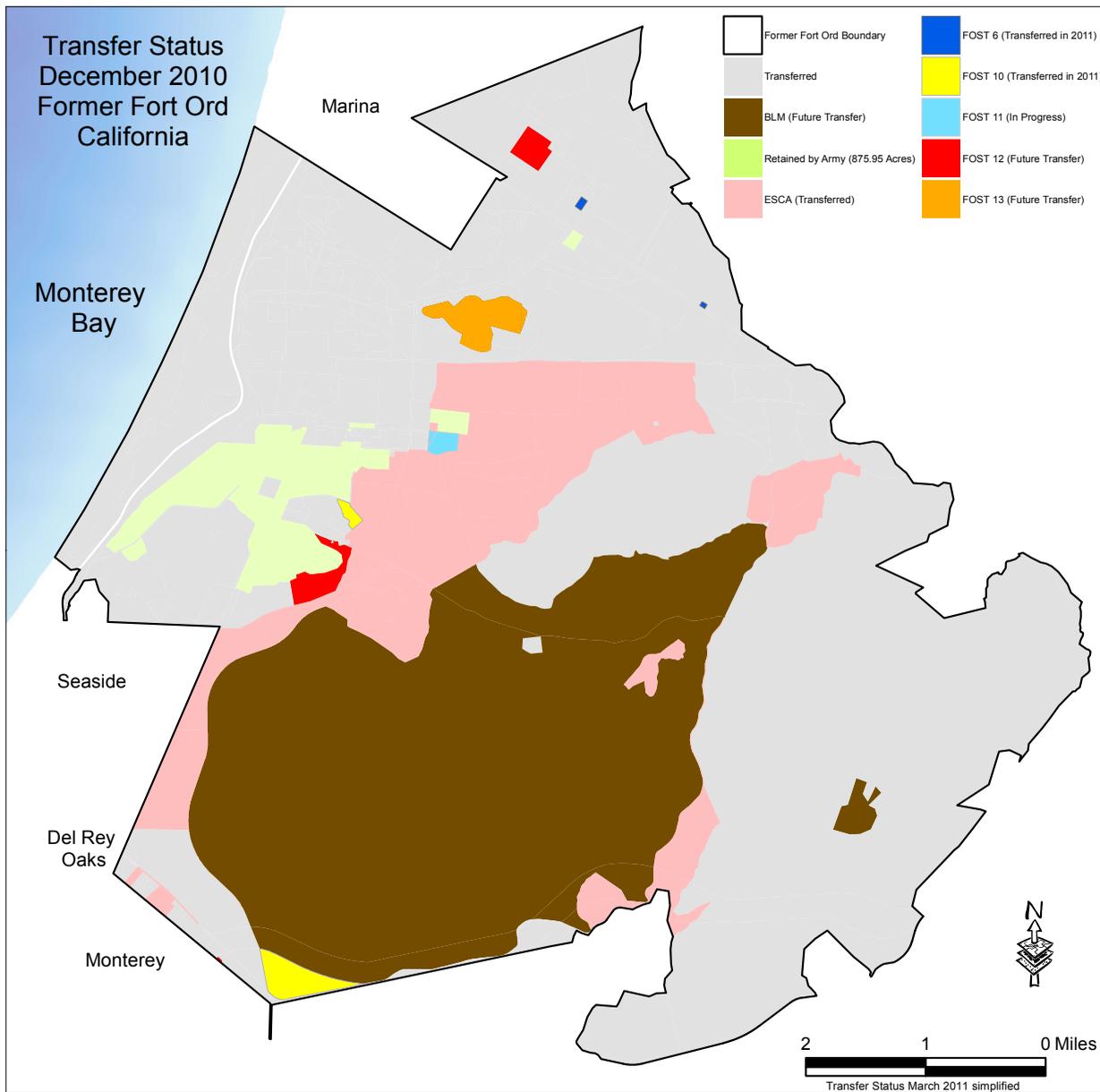
In May 2009 the Army transferred 3,336 acres of land, as described in the Finding of Suitability for Early Transfer, Environmental Services Cooperative Agreement (ESCA) Parcels and Non-ESCA Parcels (Operable Unit Carbon Tetrachloride Plume) (FOSET 5), to FORA. Under the ESCA, FORA received the land but also accepted responsibility for final cleanup of munitions and explosives of concern on this land. The Army has provided funds to FORA to pay for this cleanup. When the land is transferred before cleanup is complete, it is called an "early transfer." The key document for this kind of transfer is the FOSET, which also requires signatures at a high level from the Army and approval by USEPA and concurrence by the Governor of the State of California. The Army must describe in the FOSET how human health and the environment will still be protected even though the cleanup is not yet complete.

In March 2011, the Army completed the following land transfers:

THE FORMER FORT ORD is comprised of 28,000 acres containing many rare habitats such as coastal dunes, dune scrub, maritime chaparral, coast live oak woodland and savannas, vernal pools, and perennial grasslands. These habitats are home to many rare and endangered plants and animals.

The worldwide distributions of several of these listed species and species of concern are limited to the Monterey Bay area of California. The lands at former Fort Ord represent a substantial part of their ranges and remaining habitat. The following is a partial list of the 45 special-status species and their respective worldwide distribution on former Fort Ord.

	World-Wide Plant Distribution	Listing Status
Monterey Spineflower	75% – 95%	Federal Threatened
Toro Manzanita	70% – 90%	Species of Concern
Sandmat Manzanita	70% – 90%	Species of Concern
Eastwood's Ericameria	70% – 90%	Species of Concern
Sand Gilia	50% – 70%	Federal Endangered / State Threatened
Monterey Ceanothus	50% – 70%	Species of Concern
Seaside Bird's-Beak	30% – 50%	State Endangered



The “Big Picture” of transfer: What’s left

- 1.5 acres of property described in the Finding of Suitability to Transfer, University of California Santa Cruz, Phase I, Fort Ord, California (UCSC Phase I FOST) to the University of California.
- 4.8 acres of property described in the Finding of Suitability to Transfer, Track 0 Parcels (FOST 6) to the University of California.
- 15 acres of property described in the Finding of Suitability to Transfer, Track 0 Plug-in C, Track 1 and Track 1 Plug-in Parcels (FOST 9) to Chartwell School.
- 116 acres of property described in the Finding of Suitability to Transfer, Track 0 Plug-in Group D, Track 1 Plug-in East Garrison Areas 2 and 4 NE, and Track 1 Plug-in Groups 1 – 5 Parcels (FOST 10) to York School and Chartwell School.

Transfer of all property described in the UCSC Phase I FOST, FOST 6, FOST 9 and FOST 10 is now complete.

Land Transfers in Progress

The Army is in the process of transferring 27 acres of land described in the Finding of Suitability to Transfer, Parker Flats Munitions Response Area Parcels L2.3 and L2.4.1 (FOST 11). The Property was previously used as a training facility

for infantry troops. The property is intended to be transferred for use as public transportation and maintenance facilities. Based on a review of existing records and available information, the Army believes that, to the best of its knowledge, no Munitions and Explosives of Concern (MEC) remain on the property. But because the property was previously used for military training there is a possibility some MEC may exist on the property. As a result, no residential development will be permitted on the land. This decision was made under the Superfund process and described in a Record of Decision.

Future Land Transfers

The Army is preparing FOST 12 and other documentation for transfer of three parcels of land totaling about 117 acres (see map). The Army expects this transfer will be complete in late 2012. The two other major areas remaining to be transferred are: (1) the Fort Ord Landfills (this area will be included in FOST 13), which has not yet been completed due to placement of soils from Site 39, and (2) the 7,444 acres that will be transferred to the Bureau of Land Management (BLM), most of which is part of the Impact Area and still undergoing munitions and soil cleanup. The BLM is also a federal agency, so for the transfer of land to BLM, the Army will prepare a document like a

FOST called an Environmental Condition of Property report.

Early Transfers and Completion of Cleanup

Property transferred through the early transfer process is compatible with the anticipated future use, has manageable environmental contamination, and has community interest and public support. Later, after the cleanup is completed to the satisfaction of the Army and the regulatory agencies, the Army provides a document to be recorded in the chain of title with a covenant stating that all environmental cleanup is complete in accordance with CERCLA.

The Army has transferred about 4,438 acres of land at the former Fort Ord through the early transfer process. Of this, environmental cleanup has been completed and the Army has provided the document with the covenant, in the form of an amendment to the quitclaim deed for the property, for about 1,963 acres, which includes about 1,200 acres of the ESCA property described in FOSET 5. In 2011, the Army expects it will be able to provide the document with the covenant for an additional 324 acres described in the Finding of Suitability for Early Transfer with a CERCLA 120(h)(3) Covenant Deferral, Del Rey Oaks Parcels (FOSET 4).

2011 Survey and Interviews

A new community survey is currently being conducted, and the Army is also conducting community interviews. The results of these activities will be included in an update to the Fort Ord Community Relations Plan. Information from these surveys and interviews will also assist in evaluating community outreach activities in a Fort Ord Five Year Review (scheduled for completion in 2012).

You are invited to complete the survey, which is shown on page 11. Or you can complete the survey online at www.FortOrdCleanup.com.

If you would like to be interviewed, please contact Melissa Broadston by phone at (831) 393-1284 or by e-mail at Melissa.Broadston@us.army.mil

Community Outreach Program

The Fort Ord Cleanup Program conducts an active community outreach program (see sidebar). In both 2009 and 2010 there were over 50 significant community outreach events reaching over 100,000 community members each year.

Every two years the Army conducts a community survey and community interviews to evaluate the effectiveness of this community relations program. The last such survey was in 2009. A draft final report discussing the evaluation of the 2009 community survey results as well as an analysis of the 2009-2010 community involvement program was published in May and the next version of this report will be published later in 2011.

Analysis of Results From 2009 Survey and 2009-2010 Community Outreach Program

Based on an analysis of both the 2009 community survey and the various outreach activities in 2009 and 2010, the outreach program appears to be accomplishing its goal of making information available in an accessible manner. One of the continuing shifts showing up in the surveys and other trend data is that the Fort Ord web page has become the most important source of information for the community.

Based on the analysis of the 2009 survey and the 2009-2010 community outreach

The Fort Ord Cleanup Programs conducts the following community outreach activities:

- Fort Ord cleanup web page
- Community Involvement Workshops
- Technical Review Committee meetings
- Public comment meetings
- Information booths at community events
- Door-to-door notifications
- Open houses
- Bus tours
- Presentations
- Annual report
- Monthly mailings
- Publications
- Media relations
- Information repositories, including the Administrative Record.

program, the Army will be making some changes in the format and scheduling of community meetings, as well as increasing electronic transmittal and availability of cleanup information. These changes are:

Bus Tours: The 2009-2010 program review illustrated an increase in community interest in bus tours. The information provided on the outreach program will continue to include and emphasize information regarding how community members and groups can request a bus tour. Just call 831-393-1284 to discuss setting-up a tour.

Guided Nature Walk in the Impact Area: Based on the high level of participation (50 participants) in a guided nature walk in the impact area in 2010, a spring-time guided walk has been included in the schedule of outreach events for 2011.

Changed Format for Community Involvement Workshop: Based on positive verbal community comments during the open house portion of the February and June bus tours, the format of the Community Involvement Workshop was modified in 2010. The Community Involvement Workshop now includes an informal open house/poster session after the presentations. During this period, representatives from state and federal regulatory agencies as well as the Fort Ord Army staff and consultants are available for informal discussions with community members and to answer questions. Community questions and comments are summarized at the end of the open house/poster session and are documented in the meeting summary notes. This revised Community Involvement format was incorporated into three Community Involvement Workshops in 2010.

Schedule of Community Involvement Workshops: Based on the progress of the cleanup and survey comments supporting tours, open houses and information booths, the Army is recommending that three Community Involvement Workshops and Technical Review Committee meetings be held in 2011, plus an in-field workshop. The meetings will be focused on key cleanup topics such as groundwater issues; munitions cleanup and prescribed burns; Site 39 soil cleanup and landfill operations. The field workshop will focus on various cleanup-topics associated with the former Impact Area.

Improvement to Website and e-mail: Survey results in 2007 and 2009 indicated an increased emphasis from the community on information provided via e-mail and on the web site. In 2011 and 2012 the web site menu will be modified to make it easier to access cleanup information. Website use will also be tracked and the data used to design updates with a greater emphasis on formatting cleanup information for ease in transmitting via e-mail.

Schedule of Upcoming Activities

JUNE

June 25

Fort Ord Cleanup Bus Tour / Open House. FOCUS: Munitions Clearance and Prescribed Burns

Location: Building 4522, Joe Lloyd Way, Former Fort Ord

Visit our website, www.fortordcleanup.com or call Melissa Broadston at (831) 393-1284 for updates.

Tour 1 Departs at 10:00 am

Tour 2 Departs at 11:45 am

JULY

Small Community Group meetings

AUGUST

August 10

Community Involvement Workshop, 6:30 p.m. Meeting Begins

Location: Oldemeyer Center 986 Hilby, Seaside, CA

Topics:

- Landfill and Site 39 Update
- Environmental Services Cooperative Agreement

August 11

Technical Review Committee, 10:00 a.m. – 12:00 p.m.

Location: BRAC Office, Building 4463, Ord Military Community

Topics:

- Landfill and Site 39 Update
- Environmental Services Cooperative Agreement

SEPTEMBER

September 2-3

Information Booth at the Monterey County Fair

Date to be confirmed

California State University Monterey Bay (CSUMB) Welcome Fair Info Booth, 12:00 p.m. – 2:00 p.m.

Location: CSUMB Main Quad

OCTOBER

October 22 (Tentative)

Bureau of Land Management Public Lands Day

Location: Various Backcountry Locations at Fort Ord

Join other volunteers to help with Fort Ord projects including: habitat restoration, trash pick-up, and trail maintenance.

NOVEMBER

Small Community Group Meetings and Tours

DECEMBER

No meetings scheduled



Fort Ord Environmental Cleanup Community Survey – 2011

Fort Ord Base Realignment and Closure (BRAC)

1. When did you become aware of the environmental cleanup of the former Fort Ord?

2. How did you first learn about the environmental cleanup of the former Fort Ord?

- television news newspapers news
- newspaper notices neighbors/friends
- Fort Ord newsletter other (please describe)

3. Is the information you currently receive about the Fort Ord cleanup:

- about right too much too little
- other (please describe)

4. What type of Fort Ord cleanup activities/information interests you?

- groundwater soil military munitions
- vegetation burning suitability of property to transfer
- Environmental Services Cooperative Agreement (ESCA)
- other (please describe)

5. How would you like to receive information concerning Fort Ord cleanup?

- newsletter (mail) fact sheets (mail)
- public meetings events/tours web site
- other (please describe)

6. How would you like to communicate your interests or concerns about the cleanup to the Army?

- public meetings written comments (mail)
- email telephone 1-800 number
- small group meetings (clubs/associations)
- other (please describe)

7. What time and place would be most convenient for you to attend public meetings about Fort Ord cleanup subjects?

8. In what language(s) would like to receive cleanup information?

9. What newspaper do you read the most?

10. What library do you use the most?

11. Are you aware of the cleanup information repositories?

- Yes No

Have you visited the cleanup information repository located at: (check all that apply)

- California State University, Monterey Bay Library
- Seaside Library Fort Ord Administrative Record, Bldg 4463, Ord Military Community
- www.FortOrdCleanup.com (on-line Administrative Record access)

12. What are your particular interests or concerns about the cleanup process?

13. How would you like the Army to address your interests or concerns?

14. Is there a person, group, or organization you think would be interested in talking to the Army about the Fort Ord cleanup process?

15. Is there anything else about the cleanup you would like to share with us?

16. Do you live in the Monterey Bay area? Yes No

If yes, how long:

- 0-5 years 6-12 years 13-20 years 21 or more years

17. Are you aware of the Environmental Services Cooperative Agreement program? Yes No

If yes, is there anything you want to share concerning this program?

THANK YOU VERY MUCH FOR YOUR TIME AND INTEREST

Please return the completed survey by mail no later than July 1, 2011, to:

Fort Ord Environmental Cleanup Community Survey 2011
Fort Ord BRAC Office
P.O. Box 5008
Monterey, CA 93944-5008

Be sure to affix the appropriate postage (44¢). Or you can save a stamp/paper and take the survey on line at www.FortOrdCleanup.com. For more information, call Melissa Broadston (831) 393-1284.



2010 Annual Report

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Fort Ord Environmental Cleanup

Community Relations Office
P.O. Box 5008
Monterey, CA 93944

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Fort Ord Cleanup Program Agency Contacts

The Army is responsible for conducting cleanup of the former Fort Ord, but it must do so in a manner that complies with federal and state laws and under the supervision of federal and state regulatory agencies. The Fort Ord cleanup is being conducted under the Superfund or "CERCLA" cleanup process. CERCLA is an acronym for the federal law entitled the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund. It encompasses cleanup of soil and groundwater that contain hazardous substances such as metals, pesticides, and other chemical contaminants common to landfills, firing ranges, chemical spills, and other military sites. At Fort Ord, the Superfund cleanup is supervised by the U.S. Environmental Protection Agency, California Department of Toxic Substances Control and the Regional Water Quality Control Board. Under an agreement between the Agencies, each team assigns a representative to the Base Cleanup Team (BCT). This team makes day-to-day management decisions about the cleanup program. Contacts for each of the participating agencies in Fort Ord's cleanup are listed below.

U.S. Army

Fort Ord Base Realignment and Closure Office

P.O. Box 5008
Monterey, CA 93944-5008
Phone: (831) 393-1284
Web Site: www.FortOrdCleanup.com

Gail Youngblood, BRAC Environmental Coordinator
Phone: (831) 393-1284
Email: Gail.Youngblood@us.army.mil

Melissa Broadston, Community Involvement, Fort Ord Base Realignment and Closure Office
Phone: (831) 393-1284
Toll Free: 1-800-852-9699, press 4
Email: Melissa.Broadston@us.army.mil
www.fortordcleanup.com

U.S. Environmental Protection Agency

75 Hawthorne St., Mail Code SFD-8-3
San Francisco, CA 94105
Web Site: www.epa.gov

Judy Huang, Remedial Project Manager (for issues related to the Fort Ord Reuse Authority's Environmental Services Cooperative Agreement Remediation Program at the Former Fort Ord)
Phone: (415) 972-3681
Email: Huang.Judy@epa.gov

Martin Hausladen, Remedial Project Manager (For issues related to water)
Phone: (415) 972-3007
Email: hausladen.martin@epa.gov

Lewis Mitani, Remedial Project Manager (For issues related to the Army's military munitions response program, landfill, and Site 39)
Phone: (415) 972-3032
Email: mitani.lewis@epa.gov

Viola Cooper, Community Involvement Coordinator (for issues related to the Superfund Technical Assistance Grant Issues)
United States Environmental Protection Agency
Phone: (415) 972-3243
Email: cooper.viola@epa.gov

California Environmental Protection Agency – Department of Toxic Substances Control

8800 Cal Center Drive
Sacramento, CA, 95826
Web Site: www.dtsc.ca.gov

Roman Racca, Remedial Project Manager (For issues related to military munitions and ESCA)
Phone: (916) 255-6407
Email: rracca@dtsc.ca.gov

Franklin Mark, Remedial Project Manager (For all other cleanup issues)
Phone: (916) 255-3584
Email: FMark@dtsc.ca.gov

Tammy Pickens, Public Participation Specialist
Phone: (916) 255-3594
Email: Tpickens@dtsc.ca.gov

California Environmental Protection Agency – Central Coast Regional Water Quality Control Board

California Regional Water Quality Control Board Central Coast Region
895 Aerovista Place, Ste 101
San Luis Obispo, CA 93401-7906
Web Site: www.swrcb.ca.gov/wqcb3
Grant Himebaugh, Remedial Project Manager
Phone: (805) 542-4636
Email: ghimebaugh@waterboards.ca.gov

Fort Ord Reuse Authority Environmental Services Cooperative Agreement (ESCA) Remediation Program

100 -12th Street, Building 2880
Marina, CA, 93933
Web Site: www.fora-esca-rp.com

Stan Cook, ESCA Program Manager
Phone: (831) 883-3506
Fax: (831) 883-3675
Email: ESCA@fora.org